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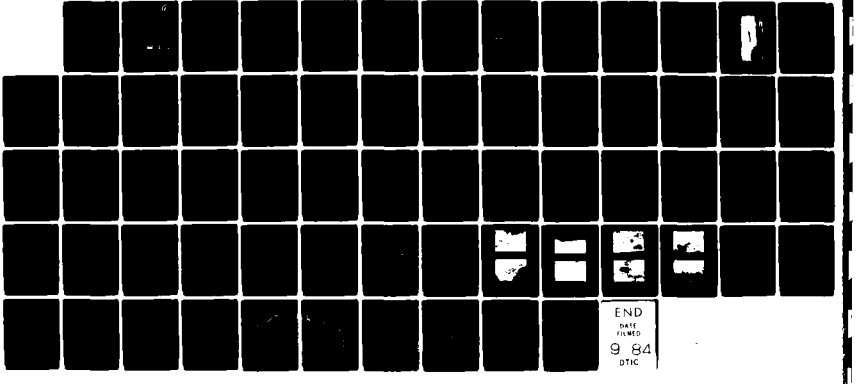

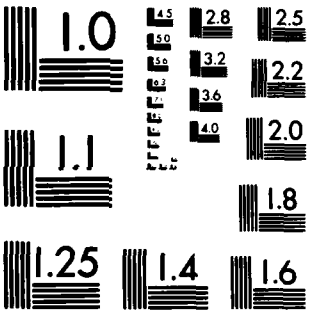

THAMES RIVER BASIN
STAFFORDVILLE, CONNECTICUT

STAFFORDVILLE RESERVOIR DAM
CT. 00333

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

DECEMBER 1978

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
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4. TITLE (and Subtitle) Staffordville Reservoir Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
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9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE December 1978 13. NUMBER OF PAGES 45
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18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Thames River Basin
Staffordville, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Staffordville Reservoir Dam is a stone masonry dam that is 525 feet long with a 125 foot spillway. Based on visual inspection, records available at the site and past operational performance, the dam is judged to be in poor condition. The dam is classified as intermediate in size and has a high hazard potential based on downstream habitation.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

NEDED-E

SEP 10 1979

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Staffordville Reservoir Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment is included at the beginning of the report.

The preliminary hydrologic analysis has indicated that the spillway capacity for the Staffordville Reservoir Dam would likely be exceeded by floods greater than 28 percent of the Probable Maximum Flood (PMF), the test flood for spillway adequacy. Our screening criteria specifies that a dam of this class which does not have sufficient spillway capacity to discharge fifty (50) percent of the PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The term "unsafe" applied to a dam because of an inadequate spillway does not indicate the same degree of emergency as that term would if applied because of structural deficiency. It does indicate, however, that a severe storm may cause overtopping and possible failure of the dam, with significant damage and potential loss of life downstream.

It is recommended that within twelve months from the date of this report the owner of the dam engage the services of a professional or consulting engineer to determine by more sophisticated methods and procedures the magnitude of the spillway deficiency. Based on this determination, appropriate remedial mitigating measures should be designed and completed within 24 months of this date of notification. In the interim a detailed emergency operation plan and warning system should be promptly developed. During periods of unusually heavy precipitation, round-the-clock surveillance should be provided.

NEDED-E
Honorable Ella T. Grasso

I have approved the report and support the findings and recommendations described in Section 7, with qualifications as noted above. I request that you keep me informed of the actions taken to implement these recommendations since this follow-up is an important part of the non-Federal Dam Inspection Program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. This report has also been furnished to the owner of the project, Schawanda Button Company, Staffordville, Connecticut 06077.

Copies of this report will be made available to the public, upon request to this office, under the Freedom of Information Act, thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for the cooperation extended in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification Number:	CT 00333
Name:	Staffordville Reservoir Dam
Town:	Staffordville
County and State:	Tolland County, Connecticut
Stream:	Furnace Brook
Date of Inspection:	October 5, 1978

BRIEF ASSESSMENT

The Staffordville Reservoir Dam is a stone masonry dam that is 525 feet long with a 125 foot spillway. It has a gate house with a 30 inch diameter discharge pipe which can be routed through the adjacent Schwanda Button Factory or to the downstream channel. The dam is classified as intermediate in size and has a high hazard potential based on downstream habitation.

Based on visual inspection, records available at the site and past operational performance, the dam is judged to be in poor condition. There is no engineering data available, however, there are areas of concern that should be corrected or investigated further as to their effect on the integrity of the dam.

The east bank of the downstream side of the dam shows a significant amount of water flowing from the ground that appears to be caused from a broken pipe in the lower gate chamber. This condition should be investigated further, because it could be a potentially dangerous condition.

The drainage area contributing to the dam is 8.44 square miles. The routed test flood peak outflow (Probable Maximum Flood) is 11,830 cfs which would overtop the dam by 3.1 feet. The project will pass only 28 percent of the routed test flood peak outflow before overtopping the dam.

Recommended measures to be undertaken by the owner include monitoring seepage, studying the overall condition of the dam (cracks, erosion and areas of distress), a detailed study of the spillway's capacity and establishing an inspection program. The owner should implement the recommendations and remedial measures described in Section 7 within one year after receipt of this Phase I Inspection Report.

Joseph F. Merluzzo
Connecticut P.E. #7639
Project Manager

Richard F. Lyon
Connecticut P.E. #8443
Project Engineer

This Phase I Inspection Report on Staffordville Reservoir Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Charles G. Tiersch

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

Fred J. Ravens Jr.

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

Saul Cooper

SAUL COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface evaluations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify the need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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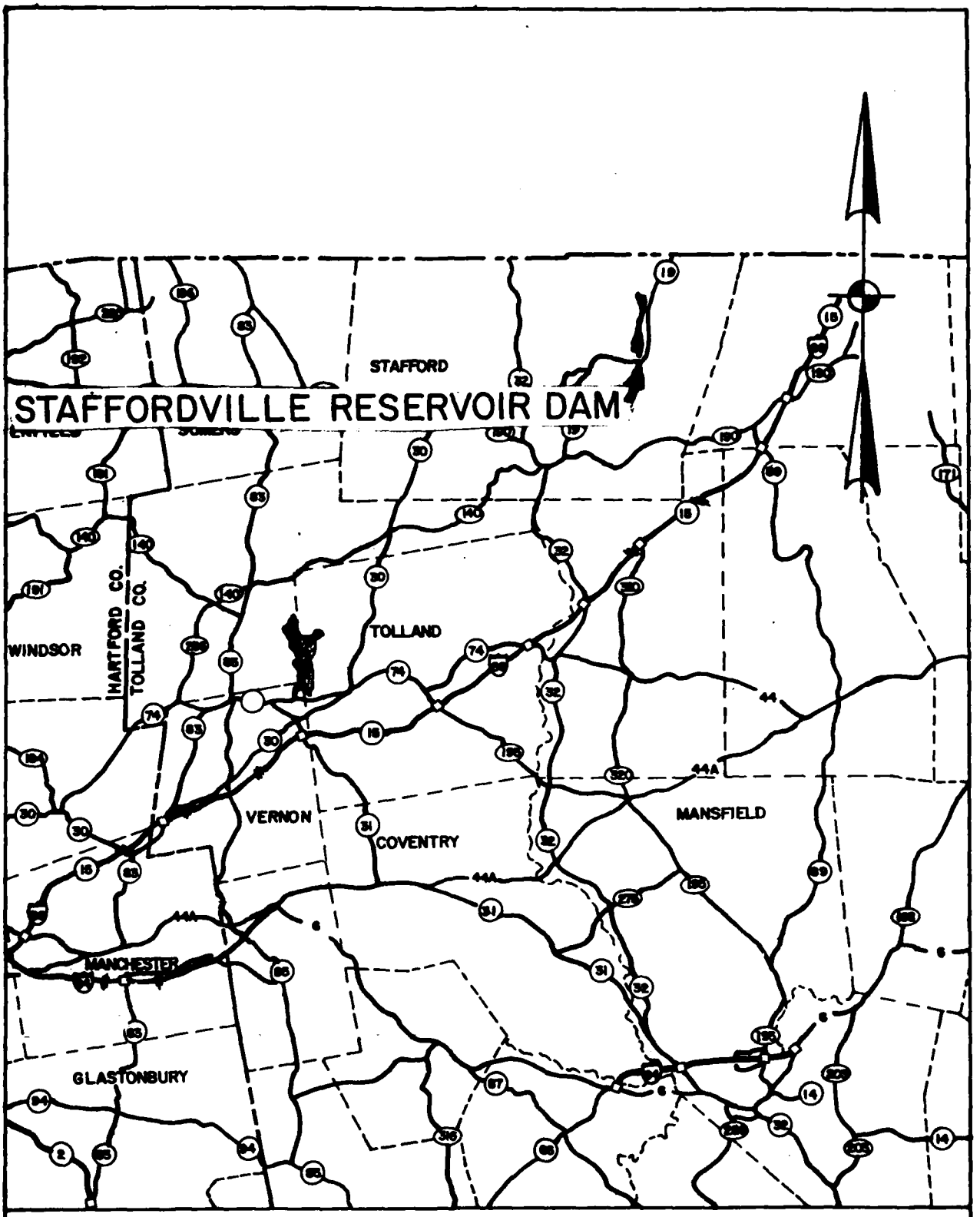

STAFFORD
STAFFORDVILLE RESERVOIR DAM
WINDSOR
HARTFORD CO.
TOLLAND CO.
TOLLAND
VERNON
COVENTRY
MANSFIELD
MANCHESTER
GLASTONBURY
U.S. ARMY, CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASS.
APPROXIMATE SCALE
SCALE OF MILES
0
10
LOCATION MAP

PHASE I INSPECTION REPORT

STAFFORDVILLE RESERVOIR DAM CT 00333

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority - Public Law 92-367, August 8, 1972 authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Storch Engineers has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Storch Engineers under a letter of May 3, 1978 from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0000 has been assigned by the Corps of Engineers for this work.

b. Purpose -

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and prepare the states to initiate quickly, effective dam safety programs for non-Federal dams.

(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location - The Staffordville Reservoir Dam is located 4.5 miles northeast of Stafford Springs in the Town of Stafford, Connecticut (See Location Map).

b. Description of Dam and Appurtenances - The structure consists of a stone masonry faced dam with an earth embankment that is approximately 525 feet long with a spillway length of approximately 125 feet. It has a gate house with a 30 inch blowoff and a 30 inch pipe to the Schwanda Button plant just downstream of the dam.

c. Size Classification - The size classification is intermediate. The storage (1,800 acre-feet) governs for size per criteria set forth in the Recommended Guidelines for Safety Inspection of Dams (Intermediate - 1,000 to 50,000 acre-feet) by the Corps of Engineers.

d. Hazard Classification - The hazard classification is high per the criteria set forth in the guidelines mentioned in Section 1.2.c above. Failure of the dam would result in the inundation of approximately 25 private residences as well as damage to the center of Staffordville (Plate 4).

e. Ownership - The Staffordville Reservoir Dam is owned by the Schwanda Button Company, Staffordville, Connecticut.

f. Operator - The person in charge of day to day operation of the dam is Mr. Schwanda, owner, Schwanda Button Company, Staffordville, Connecticut, 06077; Telephone Number: 684-7773.

g. Purpose of Dam - The Staffordville Reservoir at one time served as a primary source of power for the Schwanda Button Company, but now it is used as a supplement for their peak hours of production and for recreation.

h. Design and Construction History - There are no design computations or drawings. The Staffordville Reservoir Dam was constructed in 1850. The spillway was reconditioned, riprap was placed on the upstream face and the upstream sluice gate was replaced approximately 10 years ago.

i. Normal Operating Procedures - The dam and water is used for power during peak production hours by the Schwanda Button Company. Other than this, there are no operating procedures.

1.3 Pertinent Data

a. Drainage Area -An 8.44 square mile drainage area contributes to the dam. The terrain is rolling with very little development.

b. Discharge at Damsite - The maximum known spillway discharge was approximately 1,750 cfs during the flood of September, 1938:

(1) Outlet works: (conduits) size 30 inch, invert elevation not known.

(2) Maximum known flood at damsite: 1,750 cfs.

(3) Ungated spillway capacity at maximum pool elevation: 3,330 cfs at 702.67 elevation.

(4) Gated spillway capacity at pool elevation: N/A cfs at N/A elevation.

(5) Gated spillway capacity at maximum pool elevation: N/A cfs at N/A elevation.

(6) Total spillway capacity at maximum pool elevation: 3,330 cfs at 702.67 elevation.

c. Elevation (Feet above MSL)

(1) Top of dam: 702.67

(2) Maximum pool-design surcharge: 702.67

(3) Full flood-control pool: N/A

(4) Recreation pool: N/A

(5) Spillway crest: 698

(6) Upstream portal invert diversion tunnel: unknown

(7) Streambed at centerline of dam: 677

(8) Maximum tailwater: 685

d. Reservoir

(1) Length of maximum pool: 8,500 feet ±

(2) Length of recreation pool: N/A

(3) Length of flood-control pool: N/A

e. Storage (Acre-Feet)

(1) Recreation pool: N/A

(2) Flood-control pool: N/A

(3) Design surcharge: 1,800

(4) Top of Dam: 1,800

f. Reservoir Surface (Acres)

(1) Top of dam: 186

(2) Maximum pool: 186

(3) Flood-control pool: N/A

(4) Recreation pool: N/A

(5) Spillway crest: 130

g. Dam

(1) Type: Stone masonry gravity

(2) Length: 525 feet ±

(3) Height: 30 feet ±

(4) Top width: 15 feet ±

(5) Side slopes: vertical - see section, Appendix B

(6) Zoning: Unknown

(7) Impervious Core: unknown

(8) Cutoff: unknown

(9) Grout curtain: unknown

(10) Other: N/A

h. Diversion and Regulating Tunnel

(1) Type: Steel penstock

(2) Length: 60 feet ±

(3) Closure: N/A

(4) Access: None

(5) Regulating Facilities: manually operated gates

i. Spillway

(1) Type: fixed weir - concrete

(2) Length of weir: 125 feet ±

(3) Crest elevation: 698

(4) Gates: None

(5) U/S channel: riprapped

(6) D/S channel: 22 foot concrete apron and natural channel

(7) General: N/A

j. Regulating Outlets

Regulating outlets include a 30 inch penstock that discharges just below the dam.

(1) Invert: unknown

(2) Size: 30 inch

(3) Description: steel penstock

(4) Control mechanism: manually operated gate

(5) Other: N/A

SECTION 2 - ENGINEERING DATA

2.1 Design

There is no design information for the dam, only the oral information that was transferred from the owner, Mr. Schwanda.

About ten years ago, the training walls of the spillway were capped with a coat of gunite and the upstream bank on the eastern side had a riprap face installed.

2.2 Construction

There are no records or photographs available for the construction of the original dam.

2.3 Operation

The operation of the sluice gates or valves on the upstream face and the lower gate chamber is manual. The only repairs to the mechanical equipment is for the purpose of controlling the flow in the penstock that goes through the factory.

There is no formal or written plan available for these valves to be opened during a storm. The spillway discharges about one month out of the year.

2.4 Evaluation

a. Availability - There are no construction drawings available. Because of the age of the dam, there was no design information. The dam has no operating procedures.

b. Adequacy - The oral information that was made available was only a minor factor in the assessment, which was based mainly on the visual inspection, past performance history and hydrologic and hydraulic assumptions.

c. Validity - The dam was measured and the schematic sketches are shown (Appendix B, Plates 1 and 2).

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General - The visual inspection was conducted on October 5, 1978 by members of the engineering staff of Storch Engineers, with the help of Mr. Schwanda of the Schwanda Button Company. A copy of the visual inspection check list is contained in Appendix A of this report. Since there were no design or construction documents available, provision was made for the measurement of the existing features of the dam.

In general, the overall condition of the dam and its appurtenant structures is poor.

b. Dam - An inspection of the downstream face of the spillway (Appendix C, Photo 5) revealed several areas which needed repointing or showed signs of steady seepage. In one location on the west side of the spillway, there were signs of swampy or marshy areas. On the east side below the gate chamber there is a flow of water up through the soil (Appendix C, Photo 7) which appears to be a result of a break in the pipe in the lower gate chamber to the Schwanda Button plant. The water from the break shows no signs of suspended particles. The break was first noticed in 1973 by a Connecticut Department of Environmental Protection inspection team. Mr. Schwanda told us that he had plans to repair this pipe in the near future.

There is no underdrain system for the dam. Because the water level was down approximately five feet from the top of the spillway, the rate of seepage is fairly low. The inspection did not show signs of any movement or distress of the masonry spillway (Appendix C, Photos 1 and 2). The alignment of the dam is good and there are no signs of movement of the upstream embankment.

c. Appurtenant Structures - The lower gate chamber is structurally sound, however, the broken pipe inside could cause severe damage if it is not repaired. The headwall for the inlet sluice gate is in good condition but there are frequent problems with vandals that tamper with the service gate. The 30 inch diameter blowoff and its control valves appear to be in good condition.

d. Reservoir Area - An inspection of the embankment adjacent to or just slightly upstream from the dam showed the area to be in a natural state.

e. Downstream Channel - The spillway has a concrete apron but the downstream channel (Appendix C, Photo 4) is overgrown with trees and dense brush so that it is difficult to determine any abnormalities.

3.2 Evaluation

Overall, the general condition of the dam is poor. The visual inspection revealed some apparent areas of distress

in the mortared joints of the concrete masonry. The observation of the extensive zone of seepage on the west side, the flowing water on the east side and the broken pipe in the gate chamber indicates a need for further study so that the extent of this problem can be defined.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

The piping for this facility is operated only as required for the adjacent plant or if a drawdown of the reservoir is desired. There has been no formal procedure established for the lowering of the reservoir during periods of flooding. The maintenance staff of the Schwanda Button Company is responsible for the maintenance of the dam only as far as controlling flow through the plant during working hours.

4.2 Maintenance of Dam

About ten years ago, there was an attempt to restore the gunite finish for the training walls of the spillway. The upstream embankment was riprapped and the upstream sluice gate was also repaired at this time. Items such as clearing the downstream banks, repair of the body of the dam and restoration of the concrete surface of the spillway do not appear to have been attempted recently.

4.3 Maintenance of Operating Facilities

The maintenance of the facilities which operate the dam consists of exercising the operators of the valves to the penstock and the blowoff as well as keeping the area clear around the upper intake area.

During the reconstruction ten years ago, the stems for the intake sluice gate were reconditioned.

4.4 Description of Warning System

There is no warning system in effect.

4.5 Evaluation

In view of the lack of routine maintenance procedures, it is suggested that written procedures be established. There has been no recent effort made to clean-up the downstream area or to repair damage to the body of the dam itself. It is very important to make sure that the broken pipe inside the lower gate chamber is repaired. This should at least help the potentially dangerous boil that exists in this area.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data - The 125 foot spillway and 30 inch blowoff are the only means of transmitting water past the dam. Under conditions of the test flood (Probable Maximum Flood), the spillway will carry only a portion of the flow.

Using the guide curves supplied by the Corps of Engineers (rolling terrain), the test flood peak inflow into the reservoir is 14,260 cfs and the routed outflow is 11,830 cfs. The pond elevation at the test flood outflow is 705.8 or 3.1 feet over the top of the dam. The capacity of the spillway at the top of the dam is only 3,330 cfs, approximately 28 percent of the test flood peak outflow (Appendix D).

b. Experience Data - The Staffordville Reservoir Dam has experienced the floods of November, 1927; March, 1936; September, 1938 (maximum) and August and October, 1955. During the flood of September, 1938 the elevation of the pond was 701 feet and the discharge was approximately 1,750 cfs.

c. Visual Observations - The spillway at the time of the inspection was in good condition with some evidence of water seeping through the face of the dam (Appendix C, Photo 5).

The river channel downstream is overgrown with trees and brush and is not conducive to the free passage of flood flows.

The 30 inch blowoff is in fair condition and appears to be operable.

d. *Overtopping Potential* - Calculations by Storch Engineers indicates that the test flood peak outflow will overtop the dam by 3.1 feet (Appendix D).

SECTION 6 - STRUCTURAL STABLITY

6.1 Evaluation of Structural Stability

a. Visual Observation - There have been no formal inspections conducted by the resident staff, however, in June of 1973, this dam was observed by personnel of the State of Connecticut, Department of Environmental Protection. The visual inspection for this report showed that the structural stability of the dam is sufficient, however, there is a steady seepage flow through it as well as a heavy leak in the penstock of the lower gate chamber.

b. Design and Construction Data - There is no design and/or construction data available. The only data available was the oral information received from the resident personnel.

c. Operating Records - There are no operating records for the dam and the water level of the Staffordville Reservoir Dam is not monitored.

d. Post Construction Changes - The following changes have been noted since the completion of the dam's construction in 1850:

1. Gunite surfacing of the spillway's training walls in the early 1960's;
2. Repair to the upstream embankment by the addition of riprap.

3. Repair to the upstream sluice gate.

e. Seismic Stability - The dam is located in Seismic Zone 1 and in accordance with Recommended Phase I Guidelines does not warrant seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition - After consideration of the results of this and previous inspections, as well as meetings with resident staff, the general condition of the Staffordville Reservoir Dam is judged to be poor.

There is a considerable amount of seepage through the body of the dam, as was evidenced by the wet, soft areas available along the toe of the dam as well as the damaged penstock in the lower gate chamber.

b. Adequacy of Information - The information available is such that the assessment of the safety of the dam could be based only on the visual inspection results and the past operational performance of the dam and its appurtenant structures.

c. Urgency - It is considered that the recommendations suggested below be implemented within one year after receipt of this Phase I Inspection Report.

d. Need for Additional Investigation - Additional investigations should be implemented by the owner as outlined in the following sections.

7.2 Recommendations

In view of the lack of engineering data for evaluating the dam's behavior, it is recommended that the following measures be undertaken by the owner:

a. Monitoring of the dam for seepage including any necessary seepage analyses or other pertinent studies.

b. Further detailed studies of the spillway capacity and an increase of the total project discharge capacity if necessary.

The above recommendations should be done by a qualified registered professional engineer or engineering firm.

7.3 Remedial Measures

It is considered important that the following items be attended to as early as practical:

a. Alternatives - Not applicable.

b. O & M Maintenance and Procedures -

1. Brush and trees on the downstream area near the toe of the dam and around the lower gate chamber should be removed to facilitate the visual observation of existing and potential seepage and movement of soil.

2. Loose materials, rock deposits and brush should be removed from the spillway channel.

3. Spalled and cracked concrete of the upper gate platform, lower gate chamber and spillway should be repaired.
4. The penstock and its valve of the lower gate chamber should be repaired.
5. Plans for around-the-clock surveillance should be developed for periods of unusually heavy rains and a formal warning system should be initiated for use in the event of an emergency.
6. A program of biennial periodic technical inspection should be established.

APPENDIX A

VISUAL INSPECTION CHECK LIST A-1 to A-7

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Staffordville Reservoir Dam DATE 10-5-78

TIME 11 a.m.

WEATHER Sunny

W.S. ELEV. _____ U.S. ____ DN.S.

PARTY:

1. Richard Lyon
2. Gary Giroux
3. Miron Petrovsky
4. John Schearer
5. Rodolfo Aloma
6. Mr. Schwanda
7. _____
8. _____
9. _____
10. _____

PROJECT FEATURE	INSPECTED BY	REMARKS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

PERIODIC INSPECTION CHECK LIST

PROJECT Staffordville Reservoir Dam DATE 10-5-78

PROJECT FEATURE _____ NAME Mr. Schwanda

DISCIPLINE _____ NAME G. Giroux

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	Fair
Current Pool Elevation	Fair to good
Maximum Impoundment to Date	Fair to good
Surface Cracks	None observed
Pavement Condition	N/A
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Fair
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Not permitted
Sloughing or Erosion of Slopes or Abutments	None observed
Rock Slope Protection - Riprap Failures	Good condition-but overgrown
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	Soft spots on each side of dam
Piping or Boils	Boil due to pipe leak on east side
Foundation Drainage Features	None observed
Toe Drains	None observed
Instrumentation	None

PERIODIC INSPECTION CHECK LIST

PROJECT Staffordville Reservoir Dam DATE 10-5-78

PROJECT FEATURE _____ NAME J. Schearer

DISCIPLINE _____ NAME R. Aloma

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	UNDERWATER
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	Fair
Stop Logs and Slots	N/A

PERIODIC INSPECTION CHECK LIST

PROJECT Staffordville Reservoir Dam DATE 10-5-78

PROJECT FEATURE _____ NAME R. Lyon

DISCIPLINE _____ NAME M. Petrovsky

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Fair
Condition of Joints	Fair
Spalling	Some on face of gate house
Visible Reinforcing	Some on face of gate house
Rusting or Staining of Concrete	N/A
Any Seepage or Efflorescence	Some along face of dam
Joint Alignment	N/A
Unusual Seepage or Leaks in Gate Chamber	Broken pipe just before gate
Cracks	Old concrete - fair condition
Rusting or Corrosion of Steel	none observed
b. Mechanical and Electrical	
Air Vents	N/A
Float Wells	N/A
Crane Hoist	N/A
Elevator	N/A
Hydraulic System	N/A
Service Gates	Blowoff operable but old
Emergency Gates	None
Lightning Protection System	None
Emergency Power System	None
Wiring and Lighting System in	None

PERIODIC INSPECTION CHECK LIST

PROJECT Staffordville Reservoir Dam DATE 10-5-78

PROJECT FEATURE _____ NAME M. Petrovsky

DISCIPLINE _____ NAME G. Giroux

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	N/A cast iron conduit encased
Rust or Staining on Concrete	inside body of dam
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	Not observed
Alignment of Joints	Not observed
Numbering of Monoliths	N/A

PERIODIC INSPECTION CHECK LIST

PROJECT Staffordville Reservoir Dam DATE 10-5-78

PROJECT FEATURE _____ NAME R. Lyon

DISCIPLINE _____ NAME Mr. Schwanda

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Fair to poor
Rust or Staining	None observed
Spalling	None observed
Erosion or Cavitation	None observed
Visible Reinforcing	None observed
Any Seepage or Efflorescence	Small amount
Condition at Joints	Old but adequate
Drain holes	None observed
Channel	
Loose Rock or Trees Overhanging Channel	Channel is overgrown with trees and shrubs
Condition of Discharge Channel	Fair
General	Downstream of the gate house there is an active boil. This is due to the broken pipe in the gate house

PERIODIC INSPECTION CHECK LIST

PROJECT Staffordville Reservoir Dam DATE 10-5-78

PROJECT FEATURE _____ NAME R. Aloma

DISCIPLINE _____ NAME G. Giroux

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Fair
Loose Rock Overhanging Channel	N/A
Trees Overhanging Channel	N/A
Floor of Approach Channel	Fair to good
b. Weir and Training Walls	
General Condition of Concrete	Condition discussed under
Rust or Staining	Section "Dam Embankment"
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	
Drain Holes	
c. Discharge Channel	
General Condition	Fair to poor
Loose Rock Overhanging Channel	Area appeared heavily overgrown
Trees Overhanging Channel	Downstream cluttered with
Floor of Channel	debris
Other Obstructions	

APPENDIX B

LIST OF REFERENCES

1. Recommended Guidelines for Safety Inspection of Dams; Department of the Army; Office of the Chief of Engineers; Washington, D.C.; November, 1976.

2. Guide Curves for the Probable Maximum Flood (PMF) for Regions of New England based on past Corps of Engineers' Studies; March, 1978.

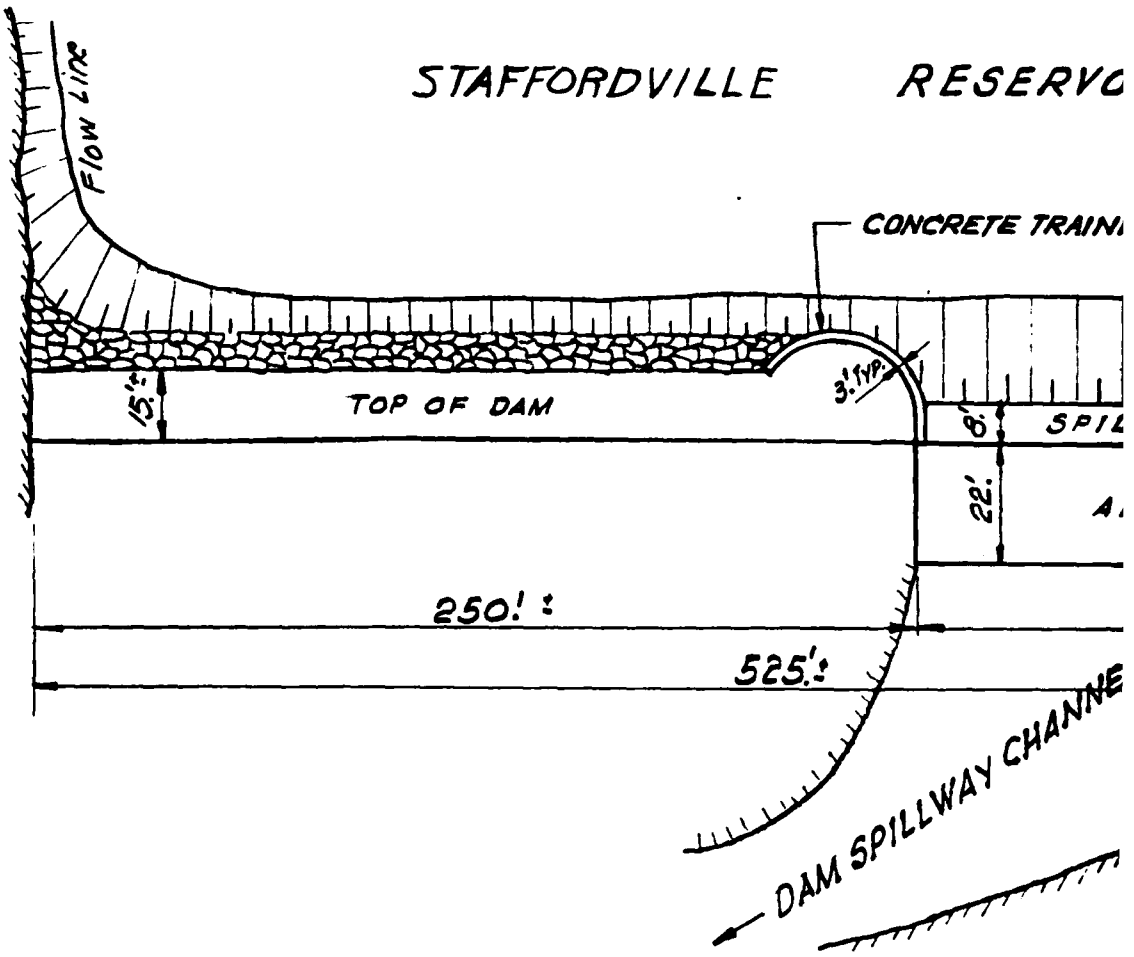
3. Preliminary Guidance for Estimating Maximum Probable Discharges in Phase I Dam Safety Investigations; New England Division; Corps of Engineers; March, 1978.

4. Rule of Thumb. Guidance for Estimating Downstream Dam Failure Hydrographs; Corps of Engineers; April, 1978.

5. Instrumentation of Earth and Rockfill Dams; EM 1110-2-1908; Department of the Army; Corps of Engineers; August, 1971.

6. Instrumentation for Measurement of Structural Behavior of Concrete Gravity Structures; EM 1110-2-4300; Department of the Army; Corps of Engineers; September, 1958.

STAFFORDVILLE RESERVO



NOTE: INFORMATION SHOWN WAS DEVELOPED FROM FIELD MEASUREMENTS TAKEN AT THE TIME OF INSPECTION.

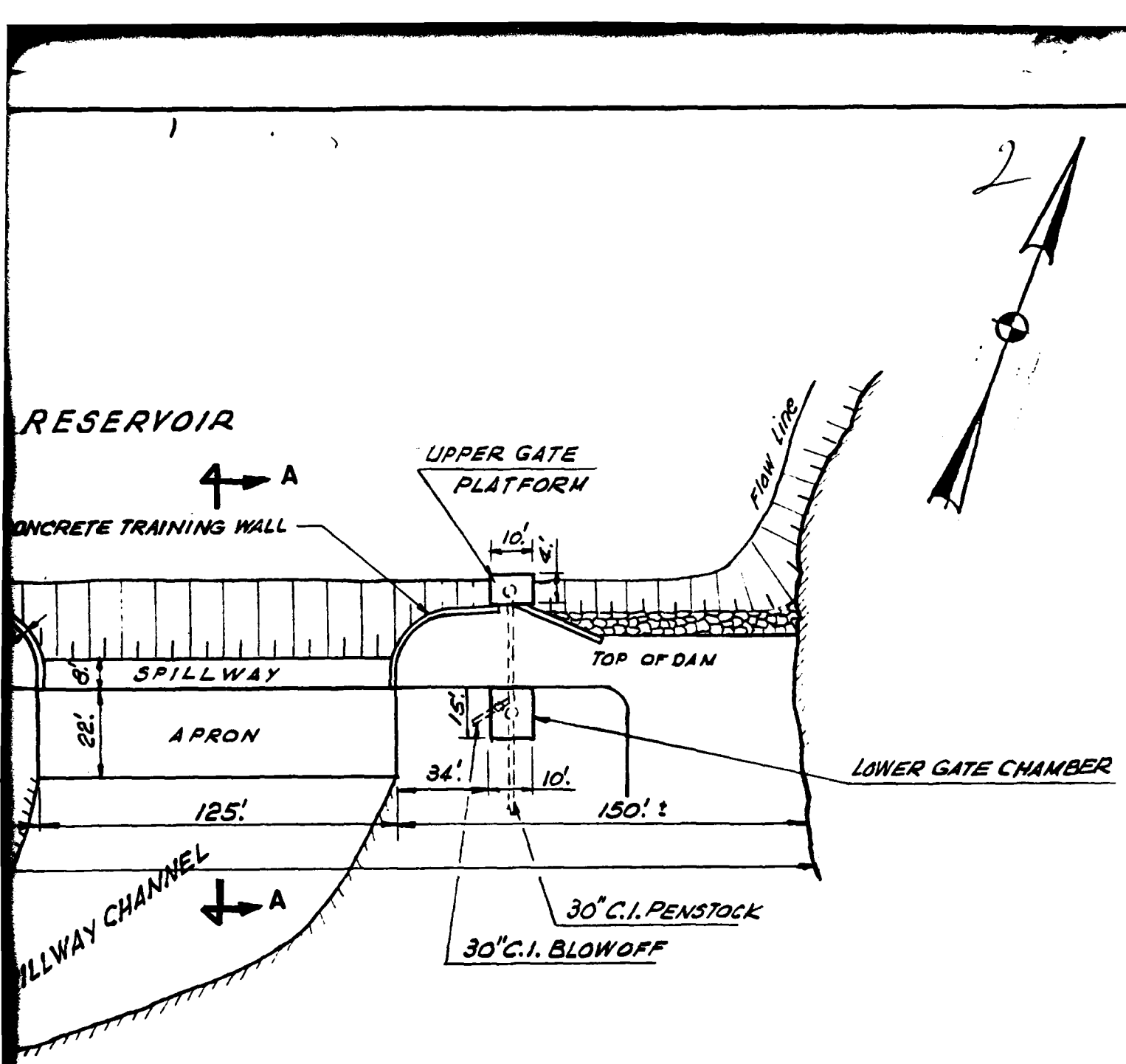


PLATE-1

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

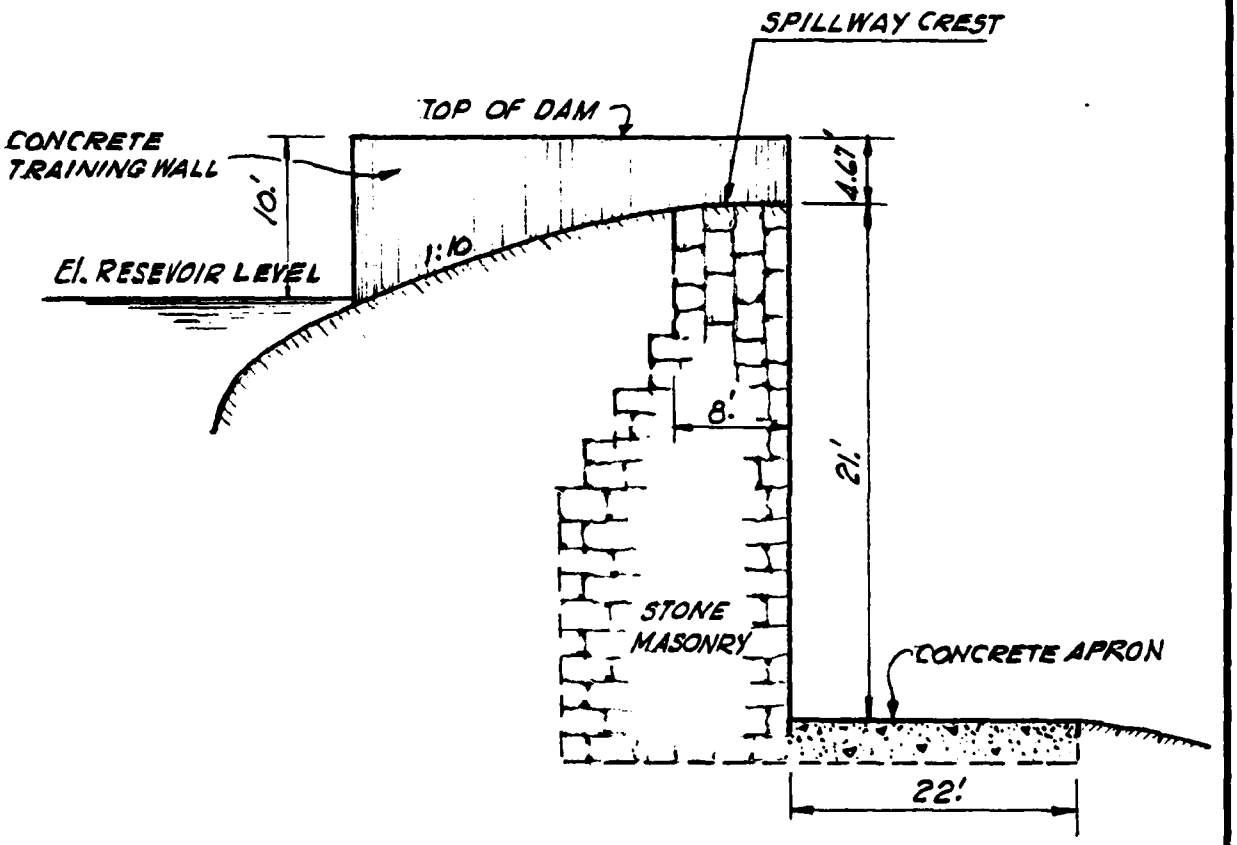
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

STAFFORDVILLE RESERVOIR DAM

FURNACE BROOK CONNECTICUT

SCALE: NOT TO SCALE

DATE : Nov. 1978

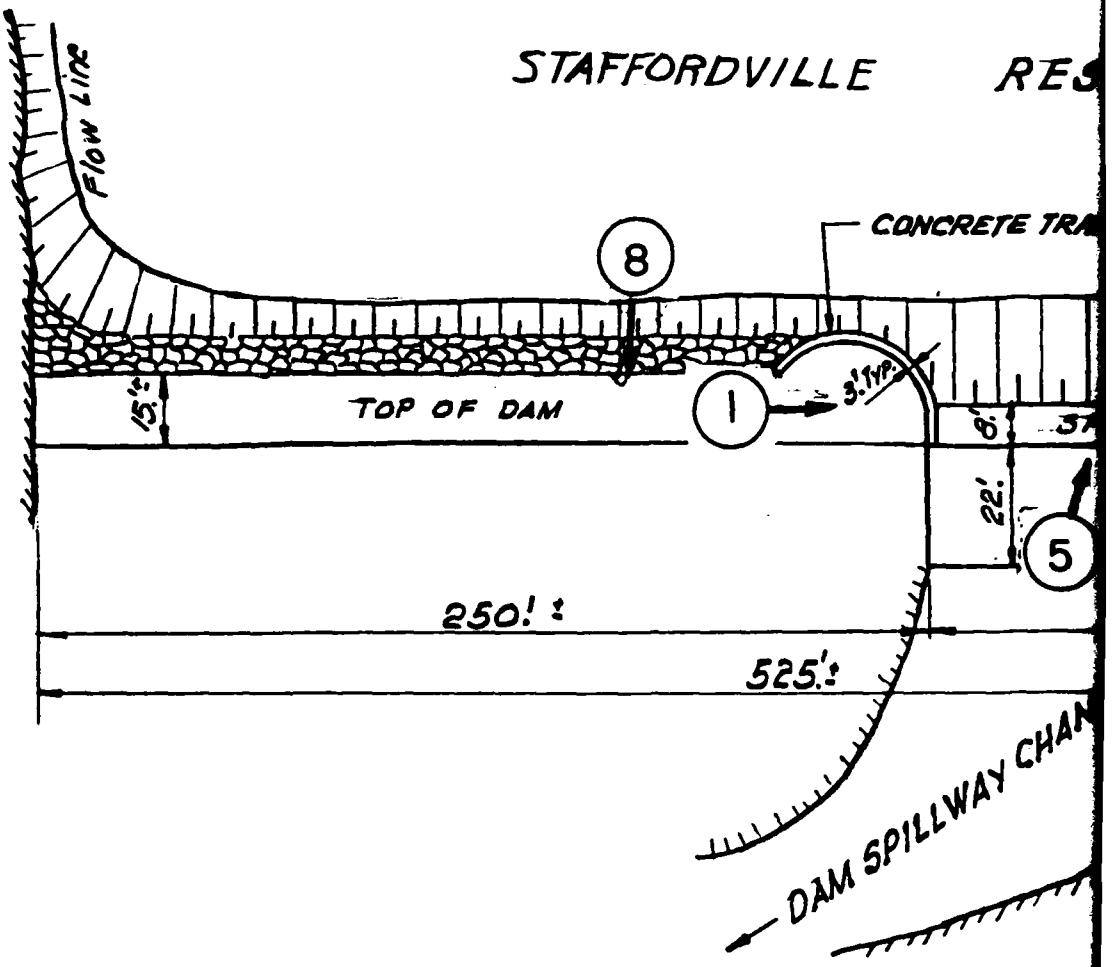


SECTION - A A

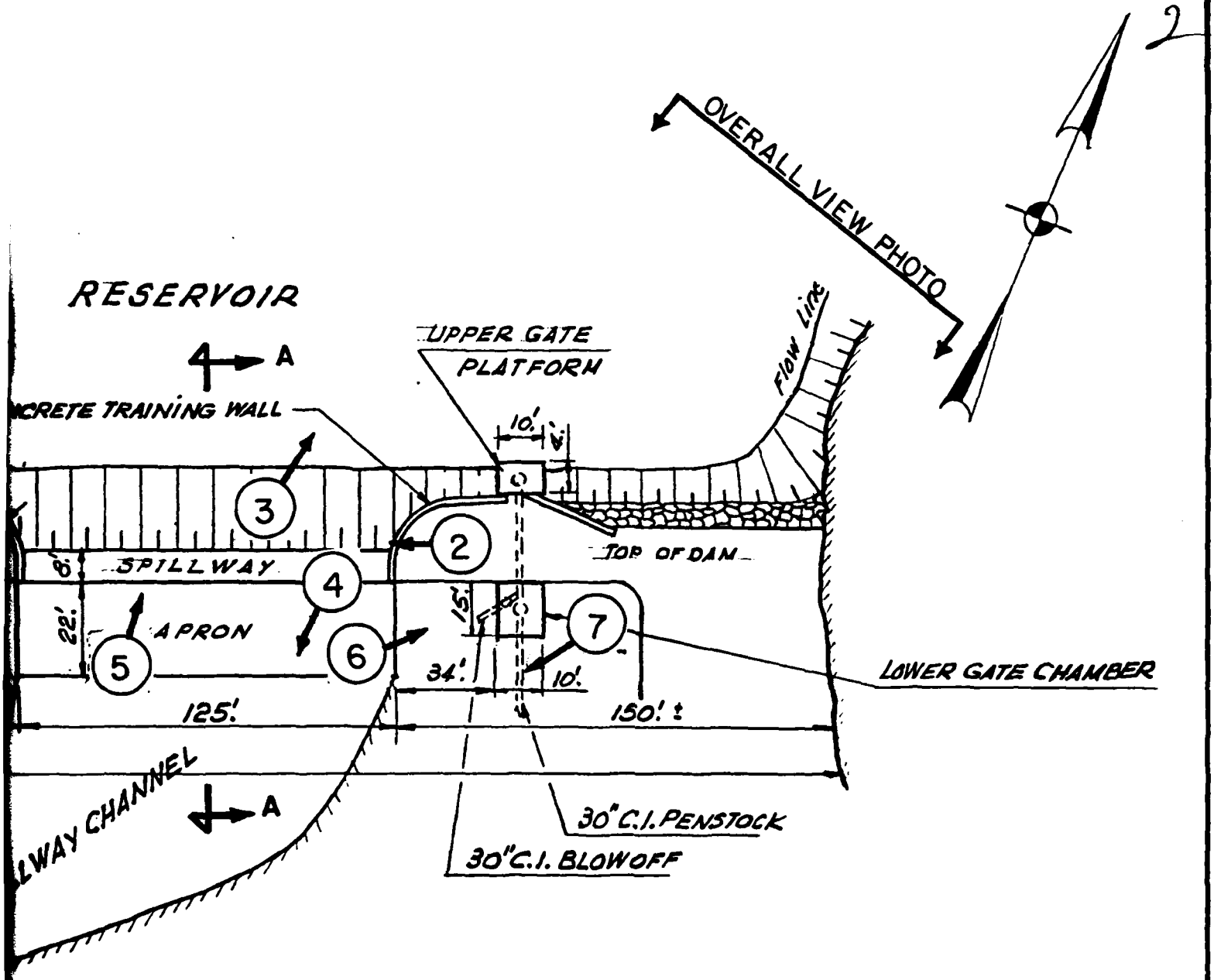
STAFFORDVILLE RESERVOIR DAM

U.S. ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION WALTHAM, MASS.	STAFFORDVILLE RESERVOIR DAM SECTION AND DETAILS	PLATE-2

APPENDIX C



2 → DENOTES PHOTO LOC



HOTO LOCATION

PLATE-3

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

STAFFORDVILLE RESERVOIR DAM

FURNACE BROOK CONNECTICUT

			SCALE: NOT TO SCALE
			DATE : Nov. 1978

PHOTO 1

CREST OF DAM LOOKING EAST

PHOTO 2

CREST OF DAM LOOKING WEST

PHOTO 3

UPSTREAM OF DAM CREST

PHOTO 4

DOWNSTREAM OF DAM CREST

PHOTO 5

SEEPAGE THROUGH STONE MASONRY WALL

PHOTO 6

BLOWOFF OUTLET

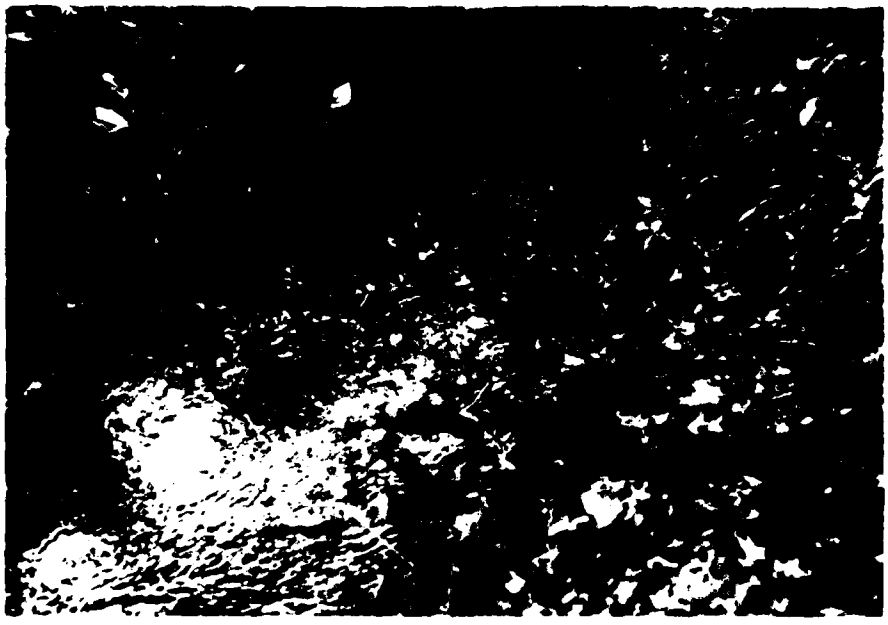


PHOTO 7

ACTIVE BOIL BELOW GATE HOUSE

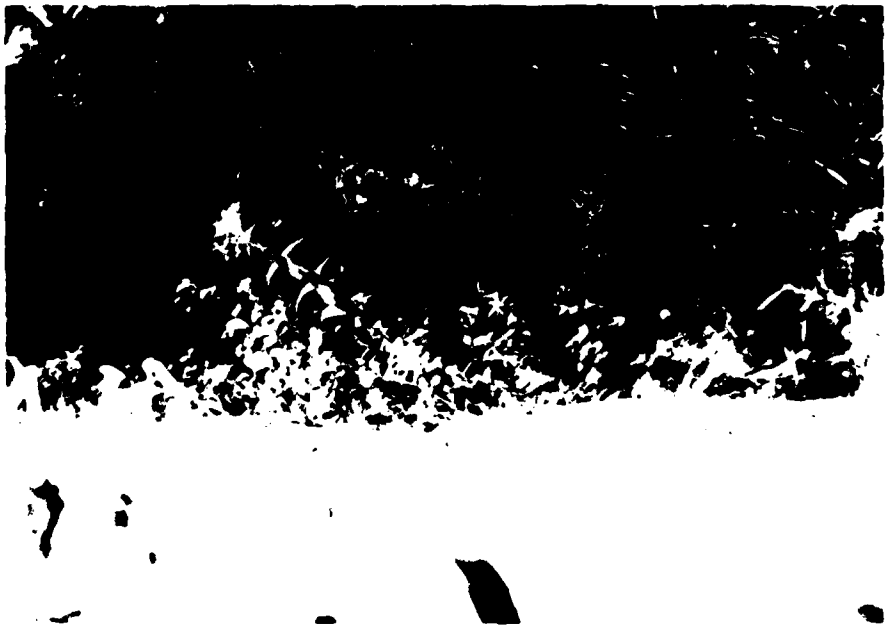


PHOTO 8

SEEPAGE AREA AT WEST TOE

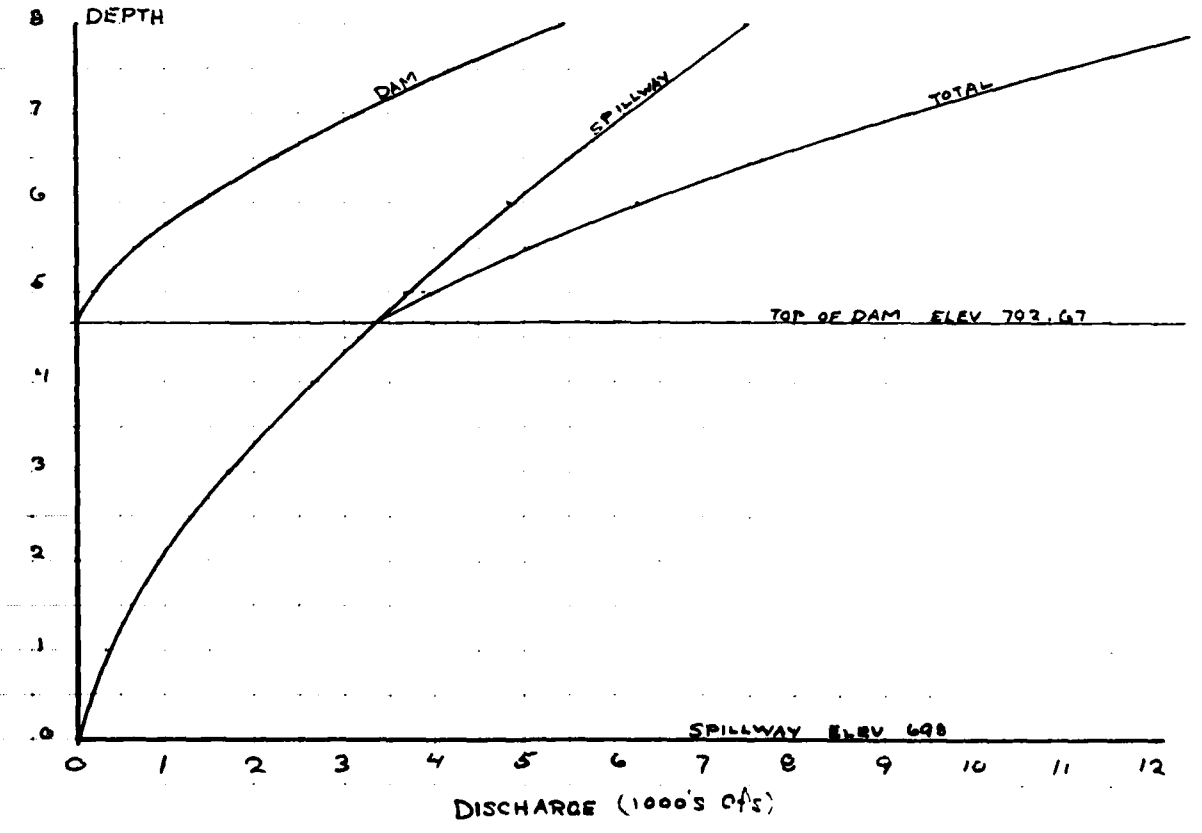
APPENDIX D

STORCH ENGINEERS
Engineers - Landscape Architects
Planners - Environmental Consultants

STAFFORDVILLE RESERVOIR DAM
STAGE DISCHARGE

SPILLWAY L= 120' DAM L= 840'

ELEV	H	C	Q	H	C	Q	Q TOTAL
696	0		0				
699	1	2.68	335				
700	2	2.64	933				
701	3	2.64	1715				
702	4	2.64	2640				
702.67	4.67	2.64	3330	0		0	
703	5	2.64	3690	.33	2.7	174	3864
704	6	2.64	4850	1.33	2.64	1377	6227
705	7	2.64	6111	2.33	2.63	3180	9291
706	8	2.64	7467	3.33	2.63	5433	12900



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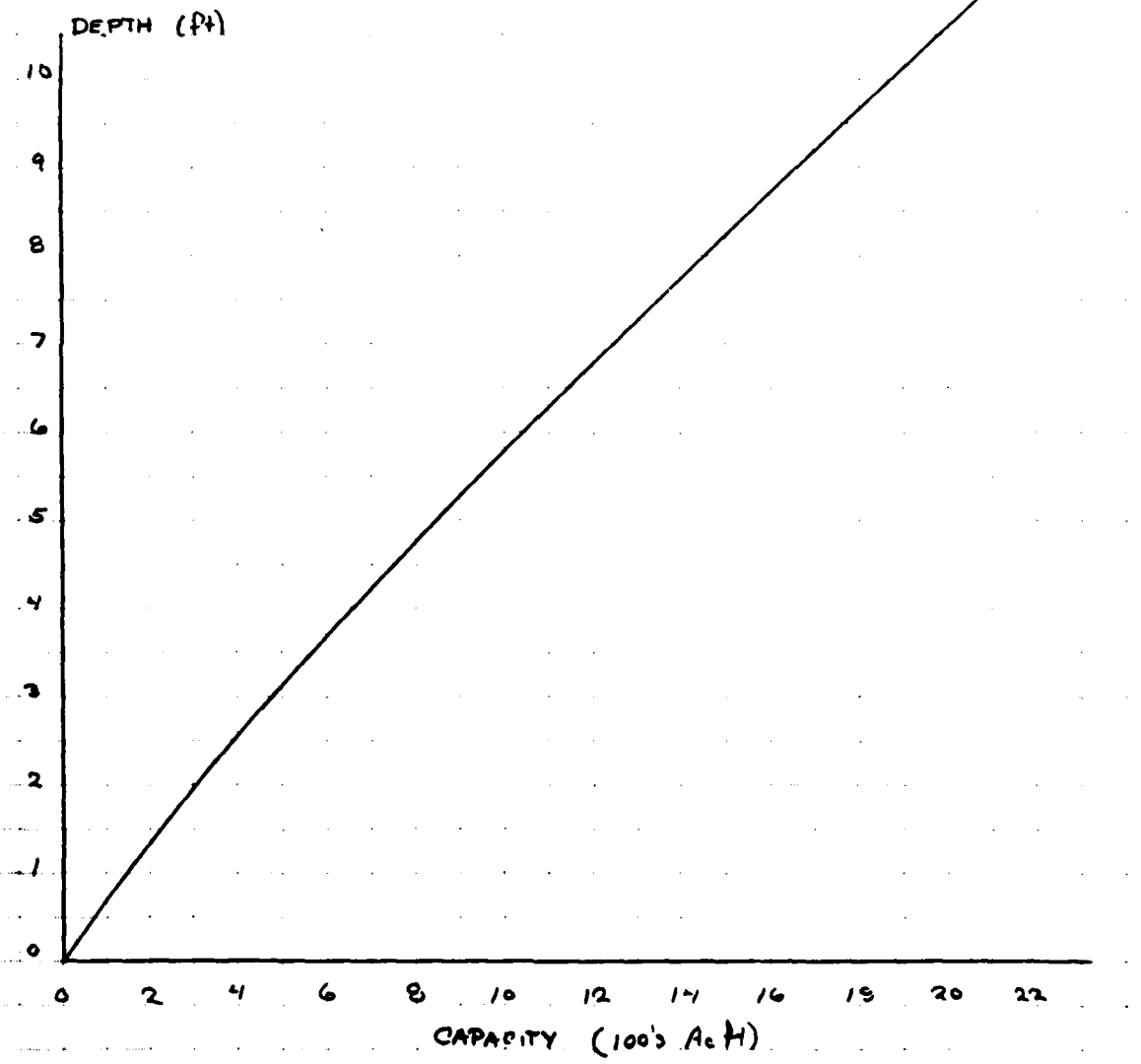
Planners - Environmental Consultants

STAFFORDVILLE RESERVOIR DAM

CAPACITY CURVE

ELEV	DEPTH	AREA	AVG AREA	VOL	Σ VOL
698		130			0
	2		150	300	
700		170			300
	10		200	2000	
710		230			2300



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STAFFORDVILLE RESERVOIR DAM
DETERMINATION of PMF & SDF

DRAINAGE AREA - 8.44 SM

INFLOW - 1690 cfs/SM

PMF_I = 1690 × 8.44 = 14260 cfs

Determine the effect of surcharge storage on the Maximum Probable Discharge

① Q_{P1} = 14260 cfs

② a. H_1 = 8.35'

b. $STOR_1$ = 3.38"

c. $Q_{P2} = Q_{P1}(1 - STOR/19) = 14260\left(1 - 3.38/19\right) = 11720$ cfs

③ a. H_2 = 7.7'

$STOR_2$ = 3.09"

b. $STOR_A$ = 3.235"

$Q_{P2} = 14260\left(1 - 3.235/19\right) = 11830$ cfs

H_A = 7.8' ELEV 705.8

$STOR_A$ = 3.13" Ok

PMF_O = 11830 cfs

Capacity of the spillway when the pond elevation is @ the top of the dam.

Q = 3330 or 28% of PMF

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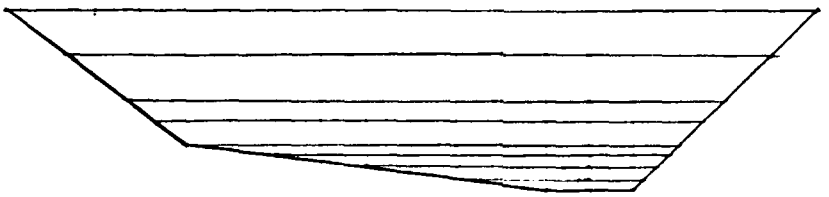
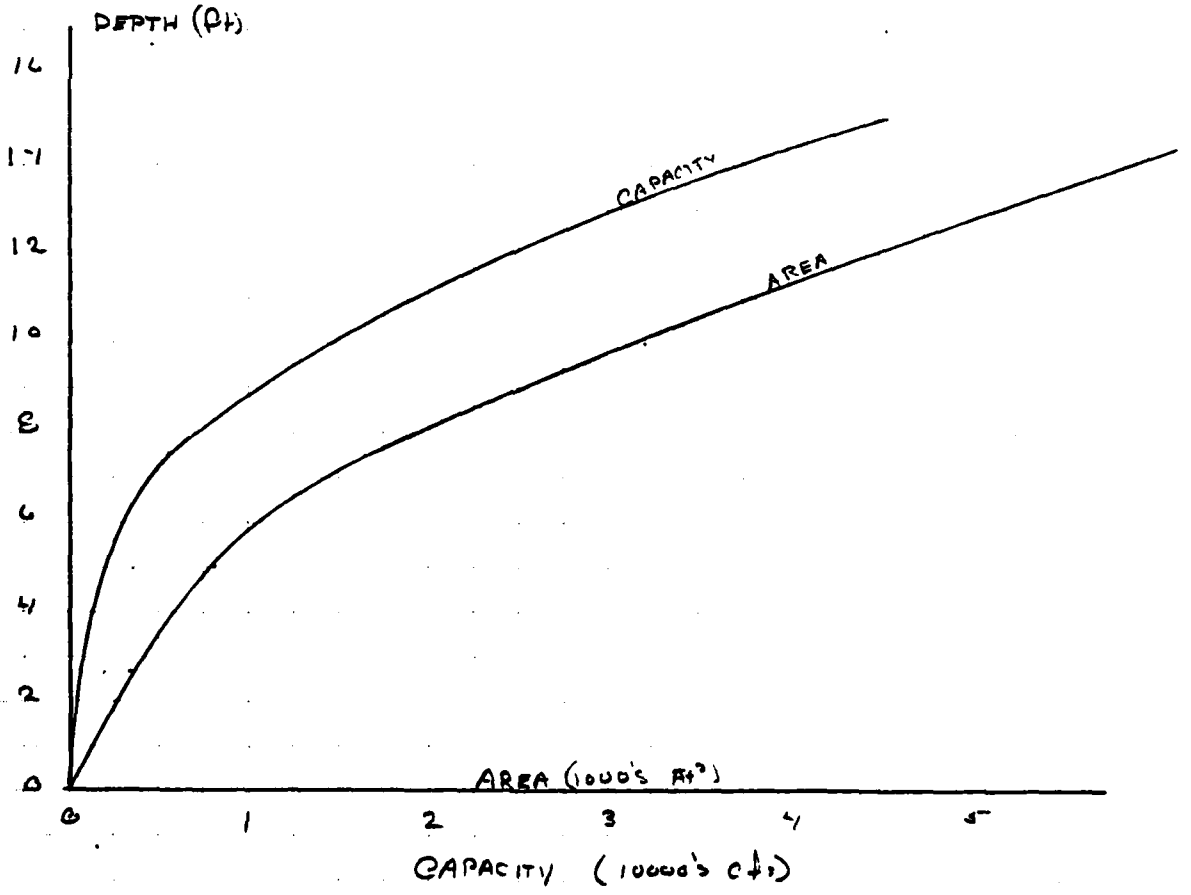
STAFFORDVILLE RESERVOIR DAM

TYPICAL SECTION



n = .06 S = .0033

D	WP	A	R	$R^{2/3}$	$S^{1/2}$	V	Q
2.5	190	325	1.71	1.43	.057	2.02	656
5.0	340	800	2.35	1.76	.057	2.48	2000
7.5	450	1650	3.67	2.37	.057	3.34	5520
10	560	3200	5.7	3.19	.057	4.51	14450
15	620	6600	10.6	4.8	.057	6.83	45122



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"RULE OF THUMB" Guidance for Estimating Downstream Failure Hydrographs

SECTION I @ Dam

① $S = 2155$ Ac-ft

② $Q_{P1} = 8/27\ W_b\sqrt{g}\ y^{1.5} = 8/27\ 174\sqrt{32.2}\ 21^{1.5} = 28158.$

SECTION II @ Stafford

④ a. $H_1 = 12.6'$ $A_1 = 4800\ ft^2$ $L_1 = 6000'$

$V_1 = 661$ Ac-ft

b. $Q_{P2} = 28153(1 - 661/2155) = 19520$ cfs

$H_2 = 11.1$ $A_2 = 3800\ ft^2$

$A_a = 4300\ ft^2$ $V_a = 592$ ac-ft

$Q_{P2} = 28153(1 - 592/2155) = 20,420$ cfs

$H_2 = 11.25'$ $A_2 = 3900\ ft^2$

SECTION III @ Stafford Springs

④ a. $H_2 = 11.25'$ $A_2 = 3900\ ft^2$ $L_2 = 12000'$

$V_2 = 1074$ Ac-ft

b. $Q_{P3} = 20420(1 - 1074/2155) = 10240$ cfs

$H_3 = 9.0'$ $A_3 = 2500\ ft^2$

$A_a = 3200\ ft^2$ $V_a = 881$ Ac-ft

$Q_{P3} = 20420(1 - 881/2155) = 12070$ cfs

$H_3 = 9.4'$ $A_3 = 2750\ ft^2$

SECTION III @ Confluence with Roaring Brook

④ a. $H_3 = 9.4'$ $A_3 = 2750\ ft^2$ $L_3 = 19000'$

$V_3 = 1199$ Ac-ft

$Q_{P4} = 12070(1 - 1199/2155) = 5355$ cfs

$H_4 = 7.5'$ $A_4 = 1650\ ft^2$

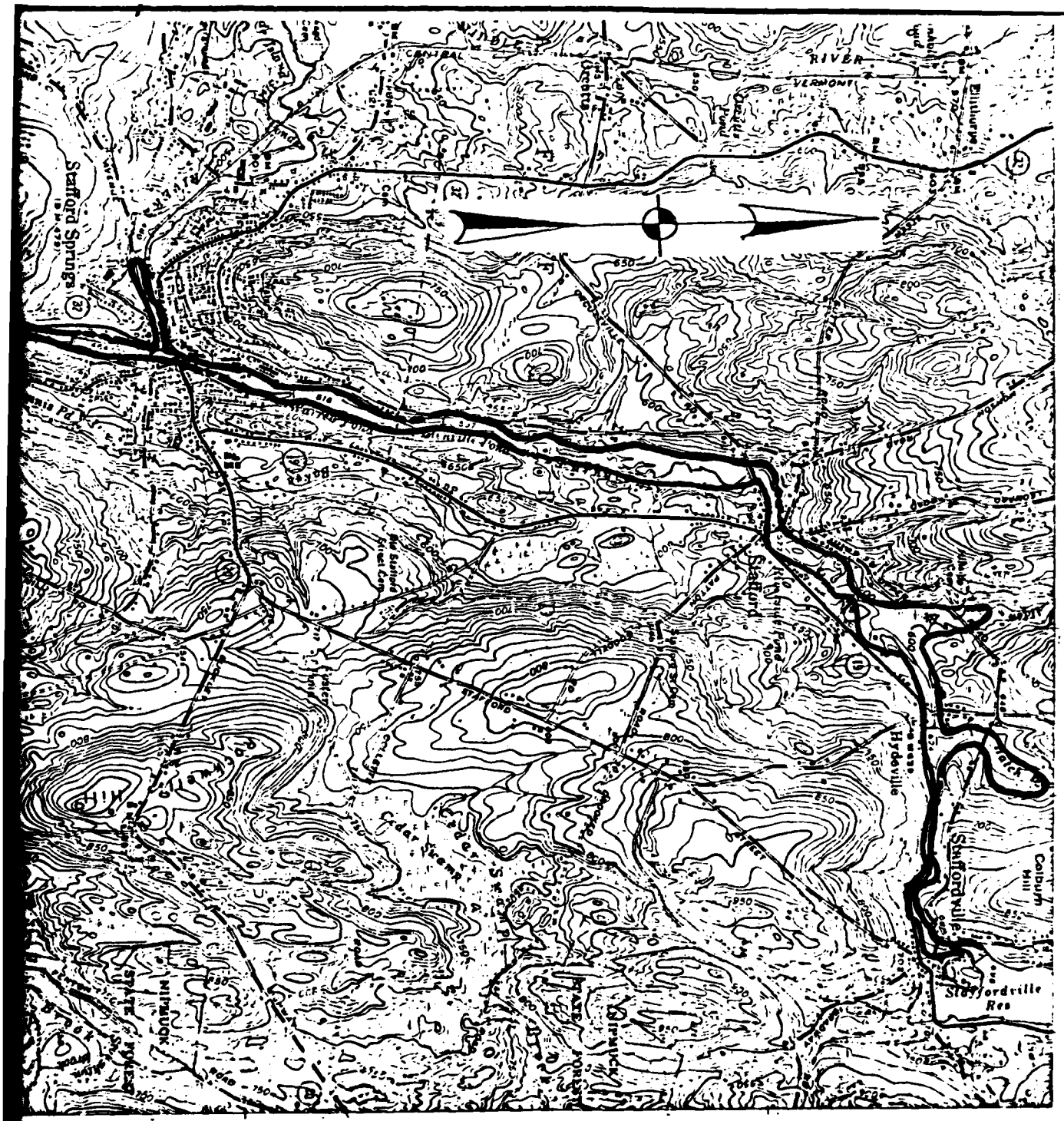
$A_a = 2200\ ft^2$ $V_a = 960$ Ac-ft

$Q_{P4} = 12070(1 - 960/2155) = 6700$ cfs

$H_4 = 7.9'$

LEGEND

DENOTES LIMITS OF FLOODING IN CASE OF DAM FAILURE



2

PLATE-4

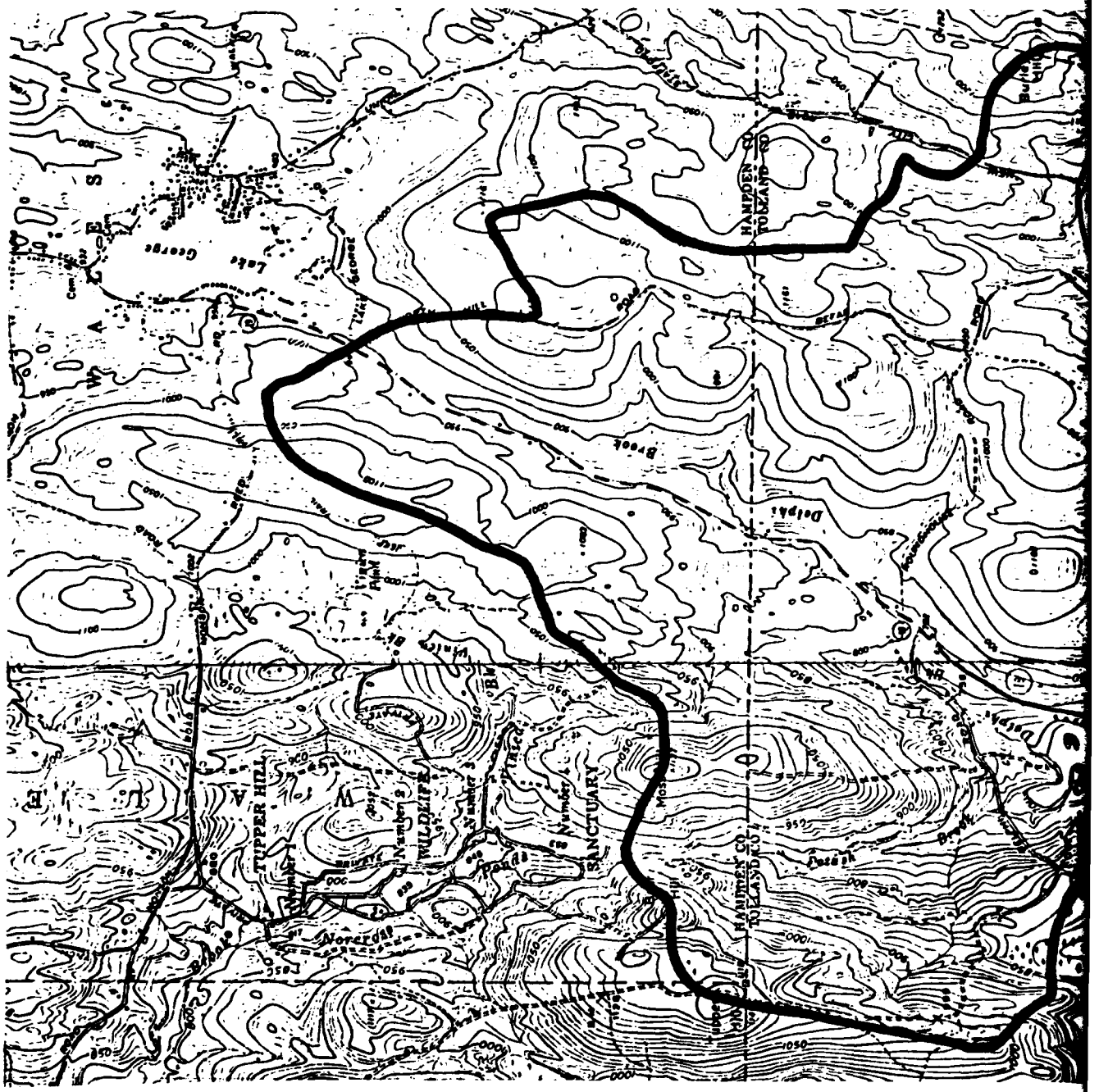
STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

STAFFORDVILLE RESERVOIR DAM

FURNACE BROOK CONNECTICUT

			SCALE: AS SHOWN
			DATE : Nov. 1978



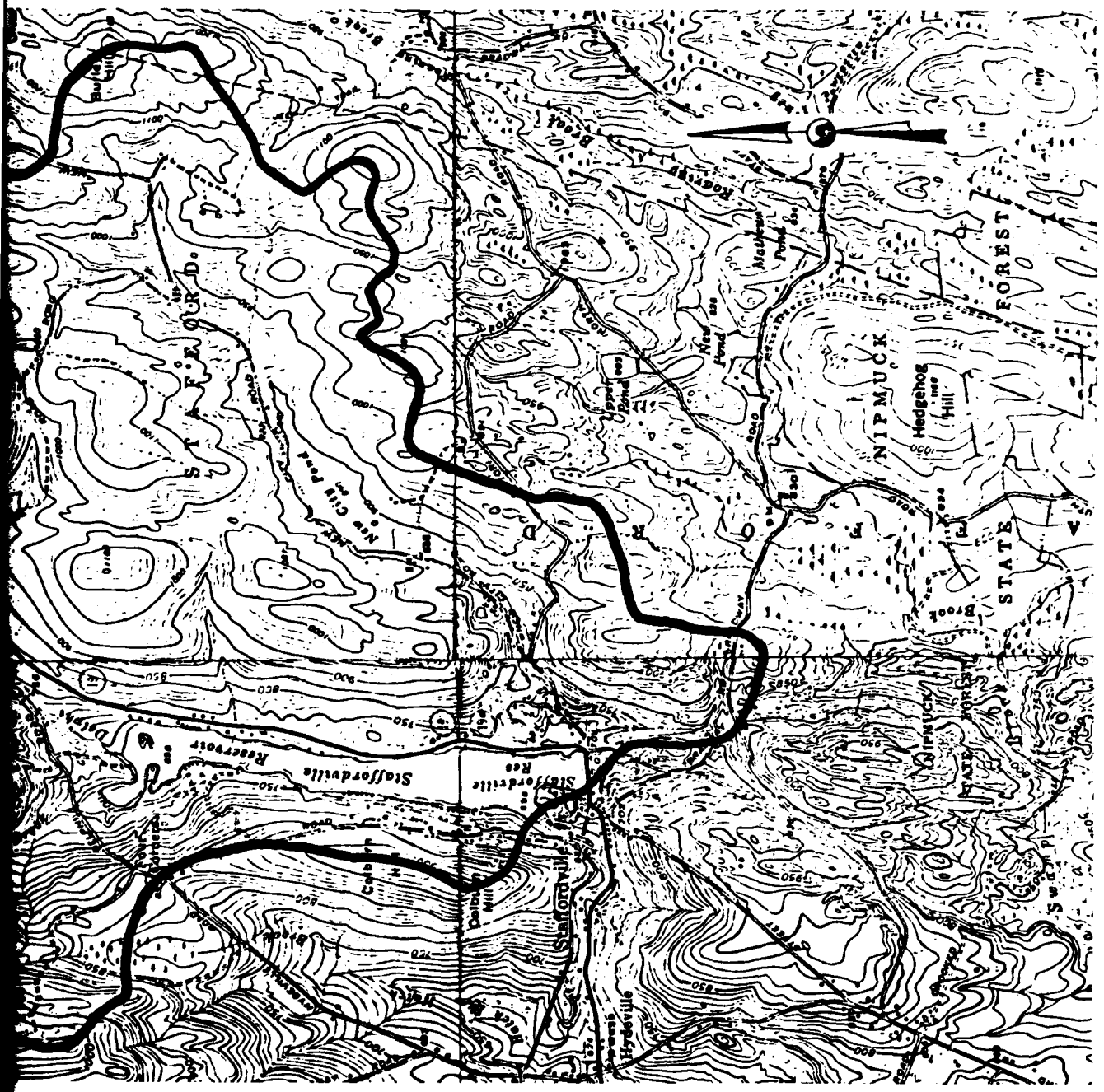
DRAINAGE AREA MAP

LEGEND

——— DENOTES DRAINAGE AREA

FROM U.S.G.S. QUAD. SHEET

STAFFORD, CONNECTICUT



SCALE

0 1 MILE

PLATE-5

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

STAFFORDVILLE RESERVOIR DAM

DELPHI BROOK — CONNECTICUT

SCALE:	AS SHOWN
DATE :	NOV. 1978

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTIFICATION NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST	(7) STATE	(8) COUNTY	(9) CONGR DIST	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY | MO | YR
CT	0[illegible]	0[illegible]	CT	013	02				STAFFORDVILLE RESERVOIR DAM	4159.8	7215.6	20DEC78

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
	STAFFORDVILLE RESERVOIR

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	07	FURNACE BROOK	STAFFORDVILLE	1	1750

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	(26) NORMAL (ACRE-FT.)	(27) DIST	(28) OWN	(29) FED R	(30) PRV/FED	(31) SCS A	(32) VER/DATE
EFRCTPG	1850	RS	30	30	2600	1800	NED	N	N	N	N	15JAN79

(33) REMARKS

21=EARTH WITH ROCK FACE 23=WATER POWER 24=ESTIMATE

(34) U/S BIAS	(35) SPILLWAY CREST LENGTH (FT.)	(36) TYP	(37) WIDTH (FT.)	(38) MAXIMUM DISCHARGE (CFS)	(39) VOLUME OF DAM (CY)	(40) POWER CAPACITY INSTALLED (KW)	(41) POWER CAPACITY PLANNED (KW)	(42) NAVIGATION LOCKS NO	(43) LENGTH (FT.)	(44) WIDTH (FT.)	(45) LENGTH (FT.)	(46) WIDTH (FT.)	(47) LENGTH (FT.)	(48) WIDTH (FT.)	(49) LENGTH (FT.)	(50) WIDTH (FT.)
1	525	0	125	5520	13125											

(51) OWNER	(52) ENGINEERING BY	(53) CONSTRUCTION BY
SCHRANDA HUTTON CO.	NOT KNOWN	NOT KNOWN

(54) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

(55) INSPECTION BY	(56) INSPECTION DATE DAY | MO | YR	(57) AUTHORITY FOR INSPECTION
STONE ENGINEERS	05OCT78	PL92-367

(58) REMARKS


ATE
LME